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# International Standard



# 5362

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Anaesthetic reservoir bags

*Ballons réservoirs d'anesthésie*

Second edition — 1986-09-15

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 5362 was prepared by Technical Committee ISO/TC 121, *Anaesthetic and respiratory equipment*.

This second edition cancels and replaces the first edition (ISO 5362:1980), of which it constitutes a minor revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

# Anaesthetic reservoir bags

## 0 Introduction

This International Standard is one of a series dealing with anaesthetic equipment and medical breathing machines and is supplementary to ISO 5356. This International Standard is primarily concerned with the design of the neck, size designation and compliance of anaesthetic reservoir bags.

The requirement that reservoir bags should be electrically conductive when used with flammable anaesthetic is widely recognized and is of particular importance when such bags are rhythmically compressed by the anaesthetist in order to provide intermittent positive pressure ventilation. Little is known about the extent of any possible fire or electrical hazards associated with the use of electrically conductive bags. While such bags reduce explosion hazards due to the generation of static electricity, they may give rise to other electrical hazards.

While it remains desirable to use conductive bags in normal anaesthetic practice, the widespread use of non-flammable anaesthetics, the development of new materials which might be used for disposable (single-use) bags and an appreciation of the possible hazards referred to above have together created a new situation. Therefore, in order to avoid restricting the development of new products it was considered undesirable to exclude non-antistatic (non-conductive) bags from this International Standard. However, such non-conductive bags should NEVER be used in the presence of flammable vapours.

Recommendations for materials are given in the annex.

## 1 Scope and field of application

This International Standard specifies requirements for reservoir bags for use with anaesthetic or breathing apparatus. It is concerned with the design of the neck, size designation, compliance and, where relevant, requirements for electrical conductivity.

Special purpose bags, for example bellows and self-expanding bags, are excluded from the scope of this International Standard.

## 2 References

ISO 2878, *Rubber, vulcanized — Antistatic and conductive products — Determination of electrical resistance.*

ISO 2882, *Rubber, vulcanized — Antistatic and conductive products for hospital use — Electrical resistance limits.*

ISO 5356, *Breathing attachments for inhalation anaesthetic apparatus, lung ventilators and resuscitators —*

*Part 1: Conical fittings and adaptors for breathing systems.*<sup>1)</sup>

*Part 2: Screw-threaded weight-bearing fittings.*<sup>1)</sup>

IEC Publication 601-1, *Safety of medical electrical equipment — Part 1: General requirements.*

## 3 Definition

**anaesthetic reservoir bag** : Collapsible container from which the patient may draw his tidal volume.

## 4 Leakage

The bag shall be free from leaks.

## 5 Size designation

The size of the bag shall be designated by the nominal capacity expressed in litres.

## 6 Preferred sizes

It is recommended that the range of preferred sizes should be 0,5 — 1 — 1,5 — 2 — 3 and 5 litres.

## 7 Capacity

The capacity of the bag shall be subject to a tolerance of  $\pm 15\%$  of the nominal capacity when tested according to the procedure outlined below.

Place the bag in a tank of water, the lower opening of the bag, if present, being sealed. Hold the bag vertically with the top rim of the opening held 25 mm above the surface of the water in the tank. Fill the bag with water. Then measure the volume of water contained in the bag.

<sup>1)</sup> At present at the stage of draft.

## 8 Neck

### 8.1 Neck for connecting to conical fittings of 22 mm size

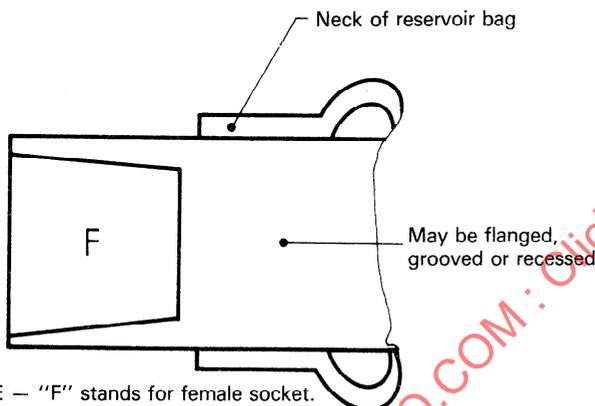
The bag shall be adequately reinforced at the neck and shall be constructed to give a satisfactory fit on male conical fittings of 22 mm size in accordance with ISO 5356/1.

The axial length of the neck of bags designed to fit 22 mm male conical fittings shall be not less than 25 mm, and not more than 35 mm.

### 8.2 Neck designed for use with breathing attachments of 15 mm size

The bag shall be adequately reinforced at the neck and shall be constructed to give a satisfactory fit on male conical fittings of 15 mm size in accordance with ISO 5356/1.

Alternatively, the bag shall have a plain (unreinforced) neck suitable for mounting on an adaptor of which the cylindrical portion has a diameter of 18 mm and an axial length of approximately 18 mm in accordance with the figure.



NOTE — "F" stands for female socket.

Figure — Adaptor for connection to reservoir bags

### 8.3 Neck reinforcement

Any reinforcement at the neck of the bag involving the use of separate components shall provide continuous secure attachment under conditions of normal use, as for example, when the bag is used for manual intermittent positive pressure ventilation.

### 8.4 Neck design

The body and neck shall be designed and assembled in such a way that they may not effect a valve-like action under normal conditions for use.

## 9 Pressure-volume test

Under the conditions described below, the pressure head of water shall be not less than 30 cmH<sub>2</sub>O and shall not exceed 50 cmH<sub>2</sub>O at any time during the test. After this test the bag shall revert within 30 min to its original capacity within a tolerance of  $^{+10}_0$  % on the actual capacity.

Place the bag in a tank of water, the lower opening of the bag, if present, being sealed. Hold the bag vertically with the top rim of the opening held 25 mm above the surface of the water in the tank. Fill the bag with water within a period of 5 min. Connect to the neck of the bag a bung of appropriate size through which a tube of not less than 10 mm bore is inserted, and of sufficient length to give a pressure head of 50 cmH<sub>2</sub>O. Add water by means of a funnel through the tube connected to the bag in order for the volume of water to correspond to four times the nominal capacity of the bag. Determine the pressure head.

The test shall be conducted with water at a temperature of  $20 \pm 3$  °C.

NOTE — The electrical conductivity of a bag which has undergone this test may be reduced, and may result in failure to meet requirements of the appropriate electrical resistance tests.

## 10 Electrical conductivity

The electrical characteristics of bags made of electrically conductive material for use with flammable anaesthetic agents shall be specified and tested in accordance with ISO 2878 and ISO 2882 respectively, or with the requirements of the appropriate national authorities.

## 11 Marking

The marking shall be legible and durable and shall include the following :

- the name or trade-mark of the manufacturer and/or supplier;
- the nominal capacity (see clauses 5 and 7);
- anaesthetic reservoir bags made of conductive material shall be marked in accordance with IEC Publication 601-1;
- anaesthetic reservoir bags made of conductive material shall be coloured black, and those made of non-conductive material shall be of any colour except black.

NOTE — It is recommended that reservoir bags should be additionally marked with the date (month and year) of manufacture.

## Annex

### Recommendations for materials

(This annex does not form an integral part of the standard.)

- A.1** The bag should be made of suitable material which should be reasonably resistant to anaesthetic agents.
- A.2** Unless designated for single use, the bag should be reasonably resistant to deterioration by methods of cleaning, disinfection and sterilization as recommended by the manufacturer or supplier. It is desirable that such products should withstand accepted methods of steam sterilization.
- A.3** The sheeting forming the body of the bag should be pliable and remain reasonably distensible when the bag is inflated to its nominal capacity.

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